

SECTION 541
FLEXIBLE PAVEMENT RECLAMATION USING PORTLAND CEMENT

541-1 DESCRIPTION

Perform the work covered by this section, including but not limited to, reclamation of roadway by pulverizing, treating with Portland Cement, mixing, and compacting the existing asphalt pavement, base, subbase, and subgrade materials to a specified depth to produce a uniform mixture which meets density requirements.

541-2 MATERIALS

Refer to Division 10:
Portland Cement, Type I, II, 1S.....Article 1024-1
Water.....Article 1024-4

Use asphalt, base, subbase and subgrade material existing in the area, or other materials proportioned by the Engineer, that is free from vegetation, roots, or other objectionable matter, and does not contain asphalt, aggregate or stone larger than 2 inches (50.8 mm).

541-3 LIMITATIONS

Do not perform flexible pavement reclamation when the air temperature is below 40°F (5°C.) in the shade or when conditions indicate that the temperature may fall below 40°F (5°C.) Do not place or mix materials with frozen subgrade. Protect the base from freezing for a period of 7 days after completion. Perform the work and meet density requirements only during daylight hours of the day the section was started, except as otherwise provided for in special provisions or traffic control plans. If the work is interrupted for more than 30 minutes after cement has been added, or if rain causes excessive moisture, reconstruct the entire section and provide the cement required at no cost to the Department. Regulate operations to limit the application of cement to sections small enough so that all of the mixing, compacting, and finishing operations can be completed within the required time limit of three (3) hours.

541-4 CONSTRUCTION REQUIREMENTS

(A) EQUIPMENT

A self-propelled reclaimer, with a minimum of 400 hp, capable of fully reclaiming the existing road to a depth of 12 inches and no less than 8 feet wide, is required. The reclaimer is also required to have a metered full-width spray bar system for adding water directly into the milling drum, and a breaker bar for use in conjunction with the milling drum.

A cement spreader that has an adjustable rate of flow and the capability of spreading the required amount of cement in one pass. Correct any leakage of fluids and/or materials promptly or the Engineer may order such equipment removed and replaced with satisfactory equipment. Use equipment and methods for applying cement and water that will not damage the roadway and meets the requirements of Article 107-22 (Safety and Accident Protection).

A motor grader equipped with a cross slope indicator, and capabilities to perform aeration, mixing, spreading and final shaping.

Water truck capable of nursing water into the reclaimer.

Water truck for adjusting moisture content and for wetting the curing reclaimed sections.

Self-propelled compaction equipment consisting of vibratory sheeps-foot, vibratory smooth-drum, and pneumatic tire rollers.

Details of the asphalt reclaimer shall be submitted to the Engineer for review at least five calendar days before the machine is brought onto the project site.

(B) LENGTH OF ROADWAY ALLOWED TO BE PROCESSED

Except by written permission of the Engineer, the length of roadway pulverized will not exceed the length that can: be completely pulverized, mixed, graded, compacted, pass density, cured and protected against damage by normal anticipated traffic in the same working day.

(C) INITIAL PULVERIZING AND MIXING

The pulverizing and mixing shall breakup the existing roadway to the specified depth to the extent that 100% weight passes a 2-inch sieve and a minimum of 50% passes a No. 4 sieve. The moisture content shall be maintained at a point that is at or below the optimum moisture content shown on the plans unless approved otherwise by the Engineer.

(D) SPREADING AND MIXING

Apply the required quantity of cement, as established by the Engineer, in a uniform spread on the pulverized roadway and immediately blend water and cement until uniformly distributed throughout the base mixture. Apply cement on days when wind will not interfere with spreading. Multiple mixing passes may be necessary to obtain thorough blending. Have the moisture content at or below the optimum moisture at the time of application of cement.

At the time of final mixing and during compaction, maintain the moisture content within a range of optimum to optimum plus 1.5% as determined. Make sure that the moisture content in the mix does not exceed the quantity that will cause the base course to become unstable during compaction or finishing operations.

541-5 COMPACTION

Begin compaction immediately after cement and water has been incorporated into the base. During compaction, maintain the moisture content of the material within a range of optimum to optimum plus 1.5%. Initial shaping may be required to obtain uniform compaction and required grade and cross-section. Initial compaction of the base should be performed with an approved self-propelled, vibratory sheep's-foot roller, to be followed by a vibratory smooth-drum roller and a pneumatic-tired roller. Compact to a density equal to at least 97% of the maximum density obtained by compaction of a material sample in accordance with AASHTO T-99, Method D, as determined by the Department.

After uniformly compacting the mixture, grade to required shape and cross-slope. Deficient areas needing additional material should be scarified before the addition of material, then compacted to density requirements, and graded to required shape and cross-slope. Copies of the testing procedures are available upon request from the Materials and Tests Unit. The Engineer may, at his option, utilize nuclear methods, as described in the current NCDOT Nuclear Gauge Operators Manual, to determine the density of the base in conjunction with the methods required above. Copies of this manual are available upon request from the Materials and Tests Unit.

Complete final compaction, including that necessary due to correction of high or low areas, within 3 hours after water has been added to the mixture. Do not leave any cement-roadway mixture undisturbed for more than 30 minutes if it has not been compacted and finished. When rain causes excessive moisture, or the 3-hour time limit is exceeded, reconstruct the entire section. When such reconstruction is necessary, perform the work of reconstruction, and provide the cement required, at no cost to the Department. The amount of cement to be used in reconstruction is 50% of the original rate. The finished surface shall be kept moist until either the curing seal, another surface treatment, or the next pavement course is applied.

541-6 CONSTRUCTION JOINTS

At the end of each day's construction, form a straight transverse construction joint by cutting back into the completed work to form a vertical face unless the road is to be opened to traffic. Build the base for large, wide areas in a series of parallel lines of convenient length and width meeting the approval of the Engineer. Form straight longitudinal joints at the edge of each day's construction by cutting back into the completed work to form a vertical face free of loose or shattered materials.

541-7 TOLERANCES

After final shaping and compacting of the base, the Engineer will check the surface of the base for conformance to the grade and typical section and determine the base thickness. Construct the thickness of the base so that it is within a tolerance of plus or minus $\frac{1}{2}$ Inch (12.7mm) of the base thickness required by the plans. Construct the base so that the maximum differential between the

established grade and the base within any 50-foot (15-meter) section is ½ inch (12.7mm)

541-8 TRAFFIC

Completed sections of the base may be opened when necessary to lightweight local traffic, provided the base has hardened sufficiently to prevent marring or distorting of the surface, and provided the curing is not impaired. Do not operate construction equipment on the base except as necessary to discharge into the spreader during paving operations.

541-9 MAINTENANCE

Maintain the base in an acceptable condition until final acceptance of the project. Include immediate repair of any defects or damage that may occur in any maintenance operation. Perform this maintenance at no cost to the Department and repeat as often as may be necessary to keep the base in an acceptable condition. Perform repairs to the base by replacing the base for its full depth.

541-10 METHOD OF MEASUREMENT AND PAYMENT

Flexible Pavement Reclamation will be measured in units of square yards. The length will be measured along the surface of the pavement. The width shall be the width specified on the plans or in writing by the Engineer.

(a) Unit Price Coverage

The contract unit price for Flexible Pavement Reclamation shall be the full price for furnishing all materials (cement, water), equipment, tools, labor, and incidentals necessary to complete the work.

(b) Payment Will Be Made Under Item No.

Flexible Pavement Reclamation – per square yard.